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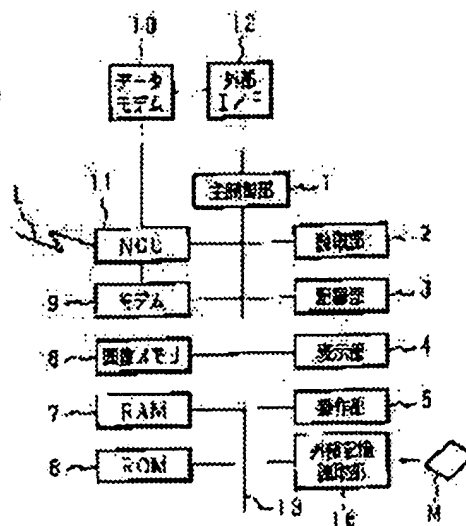
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## (54) COMMUNICATION TERMINAL EQUIPMENT WITH ELECTRONIC MAIL FUNCTION AND RECORDING MEDIUM

(57)Abstract:

PROBLEM TO BE SOLVED: To convert image data in spite of the position of an image file directory by starting the conversion of image data which is stored in an image memory at the point of time when the image file directory is received.

SOLUTION: A main control part 1 separates an electronic mail into MIME data and a mail header at the point or time when the mail header is received so as to convert MIME data into TIFF image data while storing the down-loaded electronic mail in the image memory 8. Then, TIFF image data is separated into TIFF header information and G3-form facsimile encoding image data at the point of time when TIFF header information of TIFF image data is received and, then, the offset of the image file directory is read from header information. When the offset indicates the next byte value of TIFF header information, the image file directory is read in and image data stored in the image memory 8 is decoded into dot data based on it.



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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the record medium which the communication terminal with an electronic mail function like facsimile apparatus equipped with the function linked to an electronic mail and this equipment can read.

[0002]

[Description of the Prior Art] In recent years, the computer communication network which distributes an electronic mail through the Internet which connected by the communication line and connected the local computer communication network by network further is spreading. The computer communication network is excellent in the error correction function, and a user can communicate with the computer of not only Japan but the whole world only by paying the communication link costs (connection fees and connection costs to a provider) to a nearby provider (provider to a computer communication network).

[0003] By the way, since the conventional facsimile communication procedures differ, the direct communication of them cannot be carried out to it using the computer communication network like \*\*\*\* of online communications from facsimile apparatus to a computer communication network. However, even if it is the image data usually transmitted and received by facsimile communication, he is U.S. Aldus Corporation, for example. By changing into the electronic mail of the file format like TIFF (Tagged Image File Format) which the shrine (it is a part of U.S. Adobe System now) developed, it can transmit and receive through a computer communication network.

[0004] It is possible to transmit and receive by the Internet communication link by making a facsimile message into an electronic mail from such a situation, and the communication terminal with an electronic mail function used for such an application, especially facsimile apparatus are developed.

[0005] In case facsimile apparatus equipped with electronic mail communication facility receives an electronic mail, the mail box for the facsimile apparatus in the mail box currently assigned to the mail server which logs in to a network and keeps the transmitted mail according to the mail address is checked, and if there is an electronic mail like the facsimile message which can receive, it will download.

[0006] The file (henceforth a TIFF file) of the TIFF format to download As the configuration of the page unit is typically shown in drawing 4, it has a tree structure which starts in a header (Header). A header A byte order (Byte Order), the version number of a TIFF file (TIFF Version Number), It consists of three information on the offset (Offset of 0thIFD) A of the first image identification information slack image file directory (IFD: Image File Directory), and consists of a total of 8 bytes. A byte order consists of the first 2 bytes (0 byte - 2 byte) of a TIFF file, shows how a multibyte value is saved at a TIFF file, and is described by "II (4949. Little-endian Byte Order; "H" shown by H shows a hexadecimal)", or "MM (Big-endian Byte Order shown by 4D4D.H)." A version number consists of 2 bytes next to a byte order (2 byte - 4 byte), and is described by numeric values, such as "42." Offset A consists of 4 bytes next to a version number (4 byte - 8 byte), and the location of the image file directory of the beginning in a TIFF file is described by the byte value on the basis of the head of a TIFF file.

[0007] An image file directory is usually described following this header. This image file directory is constituted in order of the offset (Offset of Next IFD) C of the number B of directory entries (Number of Directory Entries), two or more directory entries (Directory Entry) 0 and 1, --, the next image file directory. The number B of directory entries consists of the first 2 bytes (A byte-A+2 byte) of an image file directory, and the number of the following directory entries is shown. Each directory entries 0 and 1 and -- consist of 12 bytes (A+2 byte-A+14 byte, A+14 byte - A+26 byte, --), and various kinds of information about an actual image data is described. The offset C of the next image file directory is the last directory entry B-1. It consists of the following 4 bytes (A+2+Bx12 byte - A+6+Bx12 byte), and the byte value on the basis of the head of a TIFF file describes the location of the next image file directory. And offset of the next image file directory included in the last directory entry is made into "00000000.H" of 32 bit, and shows termination (EOL: End of Line) of this page.

[0008] Moreover, the actual image data according to each image file directory is usually described following each image file directory.

[0009] In addition, although explained as a configuration by which two or more image file directories are included in the 1-page TIFF image data and which will be "Multi-page TIFF File" if it constitutes and puts in another way, even if the TIFF file shown above is "Single-page TIFF File" generally used, it comes to have the same header as above-mentioned "Multi-page TIFF File", a single image file directory, and a single image data.

[0010] Therefore, in the case of reception with the facsimile apparatus like \*\*\*\*, read is started sequentially from a header, downloading a TIFF file, and read in and this image file directory are read for the location of the first image file directory from the offset described by the header. An image data in the procedure according to the format of the image data described in the image file directory And read in, While reading all image datas in the procedure of reading the next image file directory from offset of the image file directory described in this image file directory MH to which the file of this TIFF format is set by the specification of facsimile communication, MR, and MMR According to a coding method, sequential conversion is carried out with software at the coding image data of a dot format. etc. -- This coding image data is memorized to an image memory, and it outputs if needed.

[0011]

[Problem(s) to be Solved by the Invention] By the way, by recently, since the first image file directory was not arranged following a header but many of TIFF files which many personal computers equipped with the facsimile function are marketed, and are transmitted from such a personal computer were allotted to the halfway of a TIFF file, or termination, it had the problem that such a TIFF file was not convertible, with the facsimile apparatus which performs sequential conversion from the image file directory like the above-mentioned.

[0012] When this invention is made in view of this situation and there is no first image file directory following the received header of a TIFF file When the image data of this TIFF file is once stored in an image memory and an image file directory is received By starting conversion of the image data stored in the image memory in the data format based on this image file directory It aims at offering the record medium which the communication terminal with an electronic mail function like convertible facsimile apparatus and this equipment can read irrespective of the location of the image file directory in a TIFF file.

[0013]

[Means for Solving the Problem] The communication terminal with an electronic mail function concerning the 1st invention is characterized by having a 1st storage means to memorize the image data of the electronic mail containing the received TIFF data, a 1st detection means to detect reception of the image identification information according to said image data, and a 1st conversion means to change storage information into a dot format when said image identification information is detected.

[0014] The communication terminal with an electronic-mail function concerning the 2nd invention is characterized in the communication terminal of the 1st invention with an electronic-mail function by to have further a 2nd storage means memorize this when said image data and a different image data are received after said conversion, a 2nd detection means detect reception of the image identification

information according to said image data, and a 2nd conversion means change storage information into a dot format when said image identification information is detected.

[0015] The record medium concerning the 3rd invention is characterized by to record a program including a means to make the image data of the electronic mail which contains the received TIFF data in a communication terminal with an electronic mail function memorize, a means to make reception of the image identification information according to said image data detect, and the means to which storage information is transformed at a dot format when said image identification information is detected.

[0016] According to the communication terminal with an electronic mail function and record medium concerning the 1st and 3rd invention When the image identification information slack image file directory (IFD: Image File Directory) of the TIFF file which received is described after the image data When this image data is once memorized for the storage means and the image file directory was received Since the conversion means considered as the configuration which changes an image data into the data of a dot format based on this image file directory An image file directory can change an image data into a dot format certainly with a configuration also with the simple TIFF file described after the image data.

[0017] According to the communication terminal with an electronic mail function concerning the 2nd invention, it sets to the communication terminal with an electronic mail function of the 1st invention. Two or more image datas and the image file directory of the number corresponding to this When were described by turns in order of the image data and the image file directory, and the image data is first memorized for the storage means and the image file directory corresponding to this image data was received Since the conversion means considered as the configuration which reads an image data from a storage means and is changed into the data of a dot format, it can respond also to Multi-page TIFF File.

[0018]

#### [Embodiment of the Invention]

Below gestalt 1. this invention of operation is explained in full detail based on the drawing in which the gestalt of the operation is shown. Drawing 1 is the block diagram showing the configuration of the facsimile apparatus as a communication terminal with an electronic mail function concerning the gestalt 1 of operation. In addition, with the gestalt 1 of operation, the Internet shall be used as a computer communication network and, in addition to facsimile communication facility, such as the conventional G3 method, facsimile apparatus is equipped with the function in which the Internet communication link is possible.

[0019] The main control section 1 is MPU. It is constituted and a bus 13 is led. It not only controls each part of hardware of facsimile apparatus, but It is based on the software memorized by ROM 6. the image data of a manuscript -- MH, MR, and MMR etc. -- with a coding method Software, such as a communication procedure including control of RS232C by coding or compound-ized compound [ coding / ]-izing, the image (TIFF) conversion mentioned later, binary text conversion, e-mail edit, a modem change, and the AT command etc., is performed.

[0020] a read station 2 -- CCD etc. -- a manuscript is read with the used scanner and the dot image data changed into monochrome binary one is outputted. The Records Department 3 has printer equipments, such as an electrophotography method, prints out the image data which received by facsimile communication from other facsimile apparatus, or the image data which received by the Internet communication link as hard copy, and records it.

[0021] A display 4 is a liquid crystal display (LCD) or CRT. It is indicating equipments, such as a display, and the operating state of facsimile apparatus is displayed or the display of the image data of a manuscript which should transmit, and the image data which received is performed.

[0022] The control unit 5 is equipped with a letter key required in order to operate facsimile apparatus, a ten key (numerical keypad), a compaction dialing key, an one-touch dialing key, various kinds of function keys, etc. In addition, it is also possible by making the above-mentioned display 4 into a touch panel method to substitute for a part or all of various keys of this control unit 5.

[0023] ROM 6 store beforehand various software programs required for actuation of facsimile apparatus. RAM 7 consist of SRAM or a flash memory, and they memorize temporary data generated at

the time of activation of software. In addition, also when a flash memory is used for RAM 7, and a power source is intercepted for interruption of service, migration of facsimile apparatus, etc., the contents of storage are not lost.

[0024] An image memory 8 is constituted using DRAM etc. and memorizes the image data which should transmit, or the image data which received.

[0025] A modem 9 is FAX for the usual facsimile communications. It is a modem. A data modem 10 is a modem for the data communication for performing the Internet communication link, and is connected with the bus 13 through external I/F12. NCU 11 (Network Control Unit) are hardware which performs closing of analog network L, and actuation of disconnection, and connect a modem 9 or a data modem 10 with analog network L if needed.

[0026] In addition, you may make it connect with the digital channel of a base band transmission method by having DSU (subscriber-line terminating set: Digital Service Unit).

[0027] The external memory read station 16 like a card reader is a mask ROM. It has the insertion slot of the record medium M like the used IC card, software is read in the record medium M inserted in this insertion slot, and it stores in RAM 7.

[0028] The facsimile apparatus in the gestalt 1 of operation has the hardware configuration like \*\*\*\*, and has the function which transmits and receives the image data mainly formed into the TIFF file as an electronic mail not to mention facsimile communication facility, such as general G3 method. If it puts in another way, it is possible to form into a TIFF file the image data of the manuscript which should be carried out facsimile communication, and to transmit and receive as an electronic mail through the Internet originally. However, since the function for it is stored in ROM 6 as a software program, it explains such a function below.

[0029] the manuscript (transmitting manuscript) which should be transmitted -- an one-sheet unit, MH which will be read by the read station 2 as dot data per page if it puts in another way, and is defined by the specification of facsimile communication, MR, and MMR etc. -- the coding image data which was changed into the coding image data by software according to the coding method, and received from the outside conversely is also compound-ized by dot data with software, and is outputted as hard copy from the Records Department 3. In addition, an image memory 8 outputs the coding image data which memorized the coding image data if needed, and has been memorized conversely if needed.

[0030] Moreover, a coding image data uses for and changes software into the TIFF (Tagged Image File Format) format which is the general graphics format used by computer at the time of transmission, and is changed into the coding image data of G3 format from a TIFF format by software at the time of reception. In addition, the specification of TIFF is Class corresponding to [ in order to be opened to the public by U.S. Adobe System and to treat not only monochrome binary one but monochrome multiple value and the various data of full color \*\* ] each. It defines. CLASS F which is one of them The coding image data of G3 format is defined. Therefore, the coding image data of G3 format is CLASS F to the head. It is convertible for a TIFF format by performing comparatively easy processing of adding TIFF header information. The following and CLASS F The coding image data to which TIFF header information was added is called a "TIFF image data."

[0031] Thus, since the obtained TIFF image data is binary data, it is necessary to change it into text data with software at the time of transmission, and it needs to change the reverse, i.e., text data, into binary data with software at the time of reception. This is because the computer which cannot treat the electronic mail of binary data is also connected to the Internet. For this reason, in order to make it an electronic mail reach a phase hand certainly, in transmitting binary data, such as a TIFF image data, it is once changed into text data and it transmits. In addition, the text data treated by the Internet is RFC 822 (Request For Comments) which is the document which IETF (Internet Engineering Task Force) publishes. It sets and is specified as a 7-bit code.

[0032] Then, if conversion to text data is performed using base64 which is encoding type one of MIME (Multipurpose Internet Mail Extensions) as an example, binary data will be changed into text data by permuting by one of 64 kinds of the characters (the alphabet of a capital letter and a small letter, a figure, +, /) by 6 bitwises. In addition, it is related with MIME and is RFC1521. It is specified, for

example, encoding types other than above-mentioned base64, such as "7 bits", "8 bits", and "binary", are specified.

[0033] Like \*\*\*\*, a body, i.e., MIME data, and a mail header are separated by software, and, as for the electronic mail which the file of the obtained text data with a MIME header (henceforth MIME data) which should transmit made it the body with software, communication management information (mail header) was added, and it was edited into the appearance of an electronic mail, and was received conversely, only a TIFF image data is taken out from MIME data.

[0034] Since it is necessary to add predetermined header information to the electronic mail of the Internet, and to transmit with the text, the e-mail edit processing by such software is indispensable. Specifically, it is "Date to the head of a TIFF image data at the time of transmission. : [ " (dispatch time of an electronic mail), ] "From : "(addresser of an electronic mail), "To : " (destination of an electronic mail), "Subject:"(additional information, such as title of electronic mail)" Cc : the header information which consists of each item, such as " (the destination of the copy of an electronic mail, carbon copy), is added, and such header information is separated at the time of reception.

[0035] Next, the control procedure by the main control section 1 like the above-mentioned in case facsimile apparatus receives an electronic mail in actuation of the facsimile apparatus of a configuration is explained with reference to the flow chart shown in drawing 2. In addition, it is premised on being the configuration in which the single image file directory is included, i.e., "Single-page TIFF File", to the 1-page TIFF image data changed from the electronic mail received.

[0036] first, download of the electronic mail in a page unit -- starting (step 1) -- this electronic mail is stored in an image memory 8. Storing in an image memory 8, when a mail header is received, software separates an electronic mail into MIME data and a mail header, and MIME data are changed into a TIFF image data (step 2). And when the TIFF header information of a TIFF image data is received, software separates a TIFF image data into TIFF header information and the facsimile coding image data of G3 format (step 3), and offset of an image file directory is read from header information (step 4).

[0037] the case where check whether the next byte value of the byte value which offset of an image file directory received is shown (step 5), and offset does not show the next byte value of TIFF header information -- an image file directory -- then, it judges that the corresponding image data is not arranged and an image data is once stored in an image memory 8 (step 6). moreover, MH to which the image data which stored the image file directory in the image memory 8 at step 5 based on read in (step 7) and this image file directory when storing of step 6 was completed when offset showed the next byte value of TIFF header information or is set by the specification of facsimile communication, MR, and MMR etc. - according to a coding method, it compound-izes to dot data with software (step 8).

[0038] And it checks whether offset of the next image file directory described by the image file directory read at step 7 is "00000000.H (H shows a hexadecimal)" of 32 bit (step 9). It judges that this page is termination when it is "00000000.H", and actuation from step 1 is performed to the following page, and it judges that reception of an electronic mail was completed when it was not "00000000.H", and this reception actuation is ended. In addition, the compound-ized dot data can be outputted through the Records Department 3.

[0039] In the gestalt 1 of the above operation, although explained as a configuration which is "Single-page TIFF File" Until it receives the first image file directory, when it is "Multi-page TIFF File" Whenever it stores all directory entries in the image memory 8 and receives each image file directory, the directory entry which corresponds from an image memory 8 is read. Perform actuation of step 7 and step 8, and at step 9, in being "00000000.H" Judge it as termination of an electronic mail, and in not being "00000000.H" By repeating actuation to step 1 - step 8 to the next image file directory, the same decode as "Single-page TIFF File" can be attained.

[0040] The gestalt of the operation in case the communication terminal with an electronic mail function concerning gestalt 2. of operation, next this invention is a configuration like a personal computer is explained in full detail based on the drawing shown below. Drawing 3 is the block diagram showing the configuration of the personal computer as a communication terminal with an electronic mail function concerning the gestalt 2 of operation.

[0041] The main control section 1 is MPU. It is constituted and a bus 13 is led. It not only controls each part of hardware of a personal computer, but It is based on the software memorized by the storage section 18. the image data of a manuscript -- MH, MR, and MMR etc. -- with a coding method Software, such as a communication procedure including control of RS232C by coding or compound-sized compound[ coding / ]-izing, the image (TIFF) conversion mentioned later, binary text conversion, e-mail edit, a modem change, and the AT command etc., is performed.

[0042] A display 4 is a liquid crystal display (LCD) or CRT. It is displays, such as a display, and the operating state of a personal computer is displayed or the display of the image data of a manuscript which should transmit, and the image data which received is performed.

[0043] The control unit 5 is equipped with the keyboard required in order to operate a personal computer. In addition, it is also possible by making the above-mentioned display 4 into a touch panel method to substitute for a part or all of a key stroke of this control unit 5.

[0044] The storage section 8 consists of hard disk drives (HDD) which can be written, and stores beforehand various software programs required for actuation of a personal computer. Moreover, the storage section 8 memorizes the image data which should transmit, or the image data which received.

[0045] A modem 9 is a modem for the data communication for performing the Internet communication link, and is connected with the bus 13. Moreover, a modem 9 performs closing with analog network L, and actuation of disconnection by self.

[0046] In addition, you may make it connect with the digital channel of a base band transmission method by having DSU (subscriber-line terminating set: Digital Service Unit).

[0047] The external memory read station 16 is the disk drive of the \*\*\*\* record media M, such as a floppy disk and CD-ROM, reads software in the record medium M inserted in this disk drive, and stores it in the storage section 8.

[0048] It is a hardware configuration like \*\*\*\*, and the personal computer in the gestalt 2 of operation has the function which transmits and receives the electronic mail encoded by various kinds of methods, is considering it as the configuration which receives an electronic mail in the same procedure as the facsimile apparatus of the gestalt 1 of operation, it gives the same sign to the gestalt 1 of operation, and a corresponding part, and omits explanation.

[0049]

[Effect of the Invention] According to the record medium which the communication terminal with an electronic mail function applied to this invention as explained in full detail above, and this equipment can read When the image identification information slack image file directory (IFD: Image File Directory) of the TIFF file which received is described after the image data When this image data is once memorized for the storage means and the image file directory was received Since the conversion means considered as the configuration which changes an image data into the data of a dot format based on this image file directory An image file directory can change an image data into a dot format certainly with a configuration also with the simple TIFF file described after the image data.

[0050] Moreover, two or more image datas and the image file directory of the number corresponding to this When were described by turns in order of the image data and the image file directory, and the image data is first memorized for the storage means and the image file directory corresponding to this image data was received Since the conversion means considered as the configuration which reads an image data from a storage means and is changed into the data of a dot format, this invention does the outstanding effectiveness so -- it can respond also to Multi-page TIFF File.

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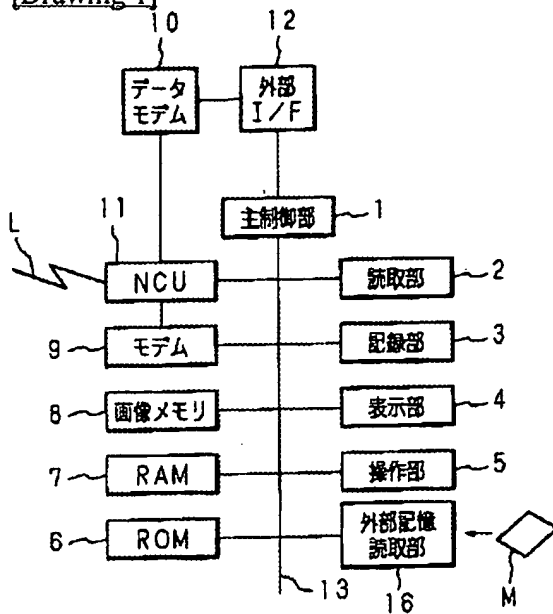
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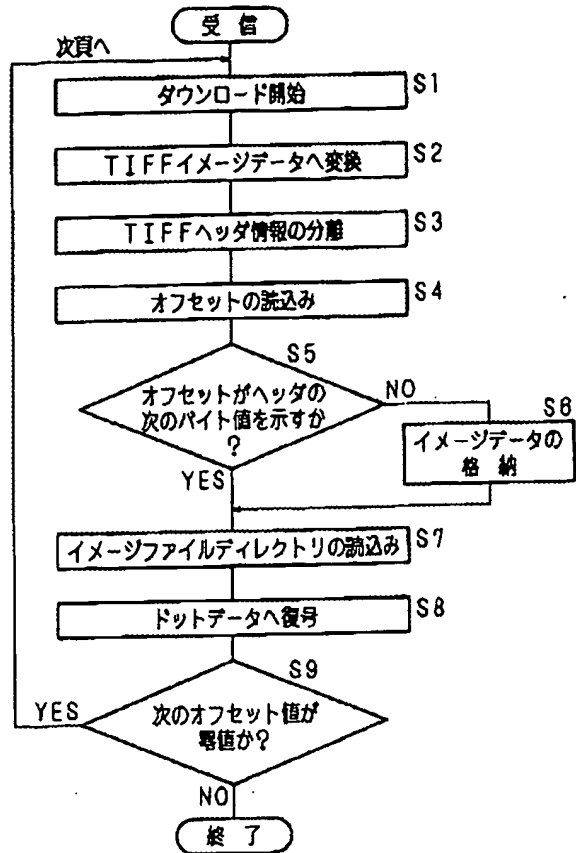
DRAWINGS

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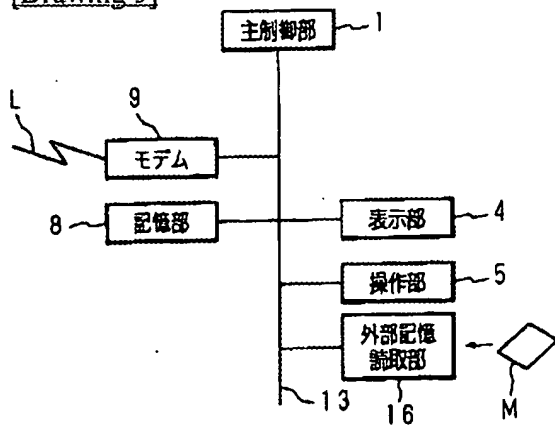
[Drawing 1]



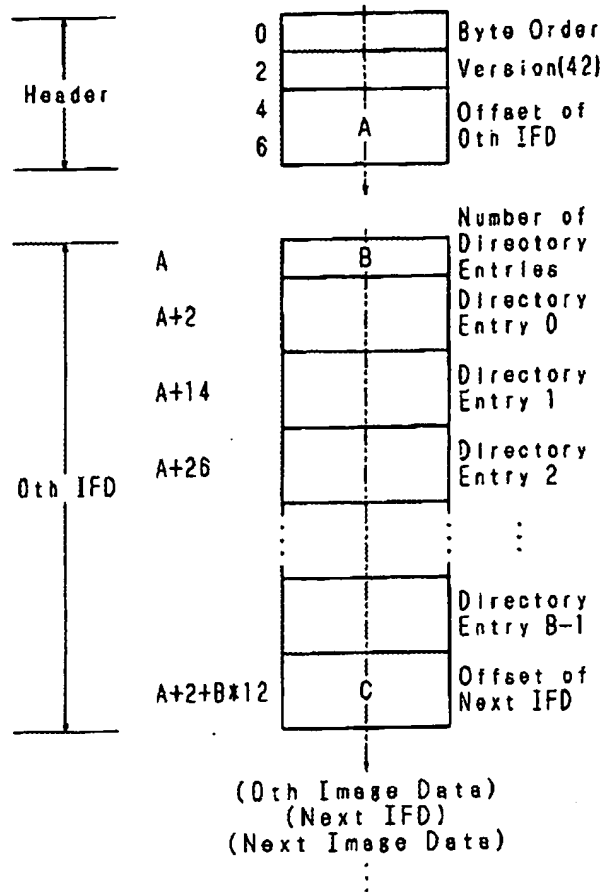
[Drawing 2]



[Drawing 3]



[Drawing 4]



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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the configuration of the facsimile apparatus as a communication terminal with an electronic mail function concerning this invention.

[Drawing 2] It is the flow chart which shows the control procedure by the main control section in case facsimile apparatus receives an electronic mail.

[Drawing 3] It is the block diagram showing the configuration of the personal computer as a communication terminal with an electronic mail function concerning this invention.

[Drawing 4] It is the mimetic diagram showing the configuration of the file of a TIFF format.

[Description of Notations]

- 1 Main Control Section
- 2 Read Station
- 3 Records Department
- 6 ROM
- 7 RAM
- 8 Image Memory
- 10 Data Modem
- 12 External I/F
- 16 External Memory Read Station
- 17 Storage Section
- M Record medium

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